WATER, AIR, AND SOIL POLLUTION / *Volumes 57–58 August 1991*

Preface and Acknowledgment ix

PART I

METALS OF WORLDWIDE INTEREST

D. B. PORCELLA, G. L. BOWIE, J. G. SANDERS, and G. A. CUTTER / Assessing Se Cycling and Toxicity in Aquatic Ecosystems 3
G. L. BOWIE and T. M. GRIEB / A Model Framework for Assessing the Effects of Selenium on Aquatic Ecosystems 13
G. F. RIEDEL, D. P. FERRIER, and J. G. SANDERS / Uptake of Selenium by Freshwater Phytoplankton 23
T. K. TOKUNAGA, D. S. LIPTON, S. M. BENSON, A. W. YEE, J. M. OLDFATHER, E. C. DUCKART, P. W. JOHANNIS, and K. E. HALVORSEN / Soil Selenium Fractionation, Depth Profiles and Time Trends in a Vegetated Site at Kesterson Reservoir 31
A. J. HORNE / Selenium Detoxification in Wetlands by Permanent Flooding: I. Effects on a Macroalga, an Epiphytic Herbivore, and an Invertebrate Predator in the Long-Term Mesocosm Experiment at Kesterson Reservoir, California 43
W. H. ORNES, K. S. SAJWAN, M. G. DOSSKEY, and D. C. ADRIANO / Bioaccumulation of Selenium by Floating Aquatic Plants 53
J. TAN and Y. HUANG / Selenium in Geo-Ecosystem and its Relation to Endemic Diseases in China 59
A. HUNT, D. L. JOHNSON, and I. THORNTON / Descriptive Apportionment of Lead in Housedust by Automated Sem 69
S. C. SHEPPARD and M. I. SHEPPARD / Lead in Boreal Soils and Food Plants 79
A. MONEM BALBA, GAMAL EL SHIBINI, and EL SAYED EL-KHATIB / Effect of Lead Increments on the Yield and Lead Content of Tomato Plants 93
J. R. DAVENPORT and F. J. PERYEA / Phosphate Fertilizers Influence Leaching of Lead and Arsenic in a Soil Contaminated with Lead Arsenate 101
H. W. MIELKE / Lead in Residential Soils: Background and Preliminary Results of New Orleans 111
A. K. ALVA and M. E. SUMNER / Characterization of Phytotoxic Aluminum in Soil Solutions from Phosphogypsum Amended Soils 121
H. SCHLEGEL and D. L. GODBOLD / The Influence of Al on the Metabolism of Spruce Needles 131
M. ACHILLI, G. CICERI, R. FERRAROLI, G. CULIVICCHI, and S. PIERI / Aluminum Speciation in Aqueous Solutions 139
L. M. SHUMAN, D. O. WILSON, and E. L. RAMSEUR / Testing Aluminum-Chelate Equilibria Models Using Sorghum Root Growth as a Bioassay for Aluminum 149
D. COCKING, R. HAYES, M. L. KING, M. J. ROHRER, R. THOMAS, and D. WARD / Compartmentalization of Mercury in Biotic Components of Terrestrial Flood Plain Ecosystems Adjacent to the South River at Waynesboro, Virginia 159
R. H. MERRY and K. G. TILLER / Distribution and Budget of Cadmium and Lead in an Agricultural Region near Adelaide, South Australia 171
M. SADIQ, I. A. ALAM, and T. H. ZAIDI / Cadmium Bioaccumulation by Clams Dwelling in Different Salinity Regimes along the Saudi Coast of the Arabian Gulf 181

PART II

ENVIRONMENTAL CHEMISTRY AND CYCLING OF METALS

N. AINSWORTH and J. A. COOKE / Biological Significance of Antimony in Contaminated Grassland 193
S. P. GONZÁLEZ / Upper Critical Level of Copper to Alfalfa, in Ten Chilean Soils 201
D. L. GODBOLD, M. LITZINGER, and C. GRIESE / Cadmium Toxicity in Clones of Populus Tremula 209
A. WYTTENBACH, L. TOBLER, and S. BAJO / Correlations between Soil pH and Metal Contents in Needles of Norway Spruce 217
D. R. SAUERBECK / Plant, Element and Soil Properties Governing Uptake and Availability of Heavy Metals Derived from Sewage Sludge 227
S. LÜBBEN and D. SAUERBECK / The Uptake and Distribution of Heavy Metals by Spring Wheat 239
R. A. YOUSSEF / Movement of Metals to Plant Roots 249
B. ALLARD, K. HÅKANSSON, S. KARLSSON, and E. SIGAS / A Field Study of Diffusion Controlled Migration of Copper, Zinc and Cadmium in a Clay Formation 259
H. XU, B. ALLARD, and A. GRIMVALL / Effects of Acidification and Natural Organic Materials on the Mobility of Arsenic in the Environment 269
F. S. GILLIAM and D. D. RICHTER / Transport of Metal Cations through a Nutrient-Poor Forest Ecosystem 279
B. L. SAWHNEY and C. R. FRINK / Heavy Metals and their Leachability in Incinerator Ash 289
A. P. SCHWAB, M. B. TOMECEK, and P. D. OHLENBUSCH / Plant Availability of Lead, Cadmium, and Boron in Amended Coal Ash 297
D. A. MAYS, P. M. GIORDANO, and A. D. BEHEL, JR. / Impact of Fluidized Bed Combustion Waste on Metal Content of Crops and Soil 307
U. FÖRSTNER, W. CALMANO, and W. KIENZ / Assessment of Long-Term Metal Mobility in Heat-Processing Wastes 319
M. SCHINTU, A. KUDO, G. SARRITZU, and A. CONTU / Heavy Metal Distribution and Mobilization in Sediments from a Drinking Water Reservoir near a Mining Area 329
J. C. M. DE WIT, M. M. NEDERLOF, W. H. VAN RIEMSDIJK, and L. K. KOOPAL / Determination of H^+ and Metal Ion Affinity Distributions for Humic Substances 339
J.-F. WAGNER / Retention of Heavy Metals from Blast-Furnace Dedusting Sludges by a Clayey Subsoil 351
R. P. GAMBRELL, J. B. WIESEPAPE, W. H. PATRICK, JR., and M. C. DUFF / The Effects of pH, Redox, and Salinity on Metal Release from a Contaminated Sediment 359
S. KUO and E. J. JELLUM / Affinity Constants and Behavior of Cd Sorption in Some Acid Soils 369
B. P., BOURGOIN, M. J. RISK, R. D. EVANS, and R. J. CORNETT / Relationships between the Partitioning of Lead in Sediments and its Accumulation in the Marine Mussel, *Mytilus Edulis* near a Lead Smelter 377
P. SANDÉN / Estimation and Simulation of Metal Mass Transport in an Old Mining Area 387
J. H. PEVERLY and R. J. KOPKA / Changes in Al, Mn and Fe from Sediments and Aquatic Plants after Lake Drawdown 399
M. SADIQ / Solubility and Speciation of Zinc in Calcareous Soils 411
R. W. PULS, R. M. POWELL, D. CLARK, and C. J. ELDRED / Effects of pH, Solid/Solution Ratio, Ionic Strength, and Organic Acids on Pb and Cd Sorption on Kaolinite 423
B. ALLARD, I. ARSENIE, K. HÅKANSSON, S. KARLSSON, A.-C. AHLBERG, T. LUNDGREN, M. COLLIN, A. RASMUSON, and E. STRANDELL / Effects of Weathering on Metal Releases from an Engineered Deposit for Alum Shale Leaching Residues 431
I. TEGEN, H. DÖRR, and K. O. MÜNNICH / Laboratory Experiments to Investigate the Influence of Microbial Activity on the Migration of Cesium in a Forest Soil 441
N. G. SAWATSKY and D. W. OSCARSON / Diffusion of Technetium in Dense Bentonite 449

I. LAMY, M. DJAFER, and M. TERCE / Influence of Oxalic Acid on the Adsorption of Cadmium at the Goethite Surface 457
C. H. QU, J. R. YANG, and C. Z. CHEN / Potential Mobilities of Elements in Suspended Matter in Major Rivers of China 467
A. E. BOEKHOLD, S. E. A. T. M. VAN DER ZEE, and F. A. M. DE HAAN / Spatial Patterns of Cadmium Contents Related to Soil Heterogeneity 479
J. L. BURGUERA, M. BURGUERA, and G. BECERRA / Simplified Flow Injection Slurry Method for Direct Flame Atomic Absorption Spectrometric Determination of Calcium, Magnesium, Sodium and Potassium in Fruits 489
M. ACHILLI, R. BARBAN, B. ZUCCHI, and W. MARTINOTTI / Elemental Analysis of Solid Environmental Samples by Low Temperature Plasma Ashing and Microwave Acid Digestion 495
L. CHERIAN and V. K. GUPTA / A New Spectrophotometric Method for the Determination of Zinc in Milk and Standard Samples 505
L. D. LACERDA, C. E. REZENDE, G. T. ARAGON, and A. R. OVALLE / Iron and Chromium Transport and Accumulation in a Mangrove Ecosystem 513
D. C. McCABE, R. PROTZ, and A. D. TOMLIN / Faunal Effects on the Distribution of Gamma Emitting Radionuclides in Four Forested Soils 521

PART III

PHYSIOLOGICAL AND TOXICOLOGICAL ASPECTS OF METALS

N. P. LAMERSDORF, D. L. GODBOLD, and D. KNOCHE / Risk Assessment of Some Heavy Metals for the Growth of Norway Spruce 535
P. CHONGPRADITNUN, K. SUZUKI, U. KAWAHARADA, K. NAKAJIMA, and M. CHINO / Immunohistochemical Localization of Metallothionein in Plant Tissues 545
R. P. COSSON, C. AMIARD-TRIQUET, and J.-C. AMIARD / Metallothioneins and Detoxification. Is the Use of Detoxication Protein for MTs a Language Abuse? 555
E. PRZEMECK and N. U. HAASE / On the Bonding of Manganese, Copper and Cadmium to Peptides of the Xylem Sap of Plant Roots 569
M. WALLBERG, L. BRYNHILDSEN, and B. ALLARD / Metal Binding Properties of *Klebsiella Oxytoca* 579
B. PEZZAROSSA, L. LUBRANO, G. PETRUZZELLI, and P. TONUTTI / The Effect on Cd Contents and Ethylene Biosynthesis in Tomato Plants of Adding Cadmium Sulphate to Soil 589
J. S. ANGLE and R. L. CHANEY / Heavy Metal Effects on Soil Populations and Heavy Metal Tolerance of *Rhizobium Meliloti,* Nodulation, and Growth of Alfalfa 597
W. P. LU and M. B. KIRKHAM / Genotypic Tolerance to Metals as Indicated by Ethylene Production 605
A. P. TURNER, N. M. DICKINSON, and N. W. LEPP / Indices of Metal Tolerance in Trees 617
N. M. DICKINSON, A. P. TURNER, and N. W. LEPP / Survival of Trees in a Metal-Contaminated Environment 627
N. D. YAN and G. L. MACKIE / Contribution of Zooplankton to the Total Cadmium Pool in Canadian Shield Lakes Varying in Acidity 635
C. E. V. CARVALHO, L. D. LACERDA, and M. P. GOMES / Heavy Metal Contamination of the Marine Biota along the Rio de Janeiro Coast, SE-Brazil 645
G. WEIGMANN / Heavy Metal Levels in Earthworms of a Forest Ecosystem Influenced by Traffic and Air Pollution 655
M. H. BHATTACHARYYA / Cadmium-Induced Bone Loss: Increased Susceptibility in Females 665
P. ISTVÁN, M. FEHÉR, J. BOKORI, and B. NAGY / Physilogically Beneficial Effects of Titanium 675

A. BENNASSAR, M. D. VAZQUEZ, C. CABOT, CH. POSCHENRIEDER, and J. BARCELO / Technetium-99 Toxicity in Phaseolus Vulgaris: Ultrastructural Evidence for Metabolic Disorders 681
I. L. BRISBIN, JR. and M. C. NEWMAN / Sigmoid Models for the Uptake, Concentration and Effects of Metals in Consumer Organisms 691

PART IV

METALS FROM NATURAL AND ANTHROPOGENIC SOURCES

J. CHEN, F. WEI, C. ZHENG, Y. WU, and D. C. ADRIANO / Background Concentrations of Elements in Soils of China 699
M. A. CARRASCO and M. PRÉNDEZ / Element Distribution of Some Soils of Continental Chile and the Antarctic Peninsula. Projection to Atmospheric Pollution 713
A. KABATA-PENDIAS and S. DUDKA / Baseline Data for Cadmium and Lead in Soils and Some Cereals of Poland 723
Y. WU, Q. ZHOU, and D. C. ADRIANO / Interim Environmental Guidelines for Cadmium and Mercury in Soils of China 733
Z.-S. CHEN / Cadmium and Lead Contamination of Soils near Plastic Stabilizing Materials Producing Plants in Northern Taiwan 745
J. LI and Y. WU / Historical Changes of Soil Metal Background Values in Select Areas of China 755
L. J. CAJUSTE, R. CARRILLO G., E. COTA G., and R. J. LAIRD / The Distribution of Metals from Wastewater in the Mexican Valley of Mezquital 763
G. HUSSAIN and M. SADIQ / Metal Chemistry of Irrigation and Drainage Waters of Al-Ahsa Oasis of Saudi Arabia and its Effects on Soil Properties 773
J. E. SLOOF and H. TH. WOLTERBEEK / Patterns in Trace Elements in Lichens 785
R. V. POUYAT and M. J. McDONNELL / Heavy Metal Accumulations in Forest Soils along an Urban-Rural Gradient in Southeastern New York, USA 797
H. DÖRR and K. O. MÜNNICH / Lead and Cesium Transport in European Forest Soils 809
O. I. ASUBIOJO, P. O. AINA, A. F. OLUWOLE, W. ARSHED, O. A. AKANLE, and N. M. SPYROU / Effects of Cement Production on the Elemental Composition of Soils in the Neighborhood of Two Cement Factories 819
M. CHINO, K. MORIYAMA, H. SAITO, and T. MORI / The Amount of Heavy Metals Derived from Domestic Sources in Japan 829
A. J. PALAZZO and C. M. REYNOLDS / Long-Term Changes in Soil and Plant Metal Concentrations in an Acidic Dredge Disposal Site Receiving Sewage Sludge 839
E. M. SEAKER / Zinc, Copper, Cadmium, and Lead in Minespoil, Water, and Plants from Reclaimed Mine Land Amended with Sewage Sludge 849
D. R. SAUERBECK and A. HEIN / The Nickel Uptake from Different Soils and its Prediction by Chemical Extractions 861
A. P. JACKSON and B. J. ALLOWAY / The Transfer of Cadmium from Sewage-Sludge Amended Soils into the Edible Components of Food Crops 873
A. BERMOND and K. BENZINEB / The Localization of Heavy Metals in Sewage Treated Soils: Comparison of Thermodynamics and Experimental Results 883
T. C. GRANATO, G. R. RICHARDSON, R. I. PIETZ, and C. LUE-HING / Prediction of Phytotoxicity and Uptake of Metals by Models in Proposed USEPA 40 CFR Part 503 Sludge Regulations: Comparison with Field Data for Corn and Wheat 891
P. R. FRESQUEZ, R. AGUILAR, R. E. FRANCIS, and E. F. ALDON / Heavy Metal Uptake by Blue Grama Growing in a Degraded Semiarid Soil Amended with Sewage Sludge 903
H. XIU, R. W. TAYLOR, J. W. SHUFORD, W. TADESSE, and D. C. ADRIANO / Comparison of Extractants for Available Sludge-Borne Metals: A Residual Study 913

AUTHOR INDEX 923
SUBJECT INDEX 927